

Columbia-Presbyterian
Medical Center
Annual Report 1986





The history of the Columbia-Presbyterian Medical Center is like a microcosm of the history of medical achievement: in nearly every field, today's major advances can be seen

as the product not only of today's efforts, but also of the scientific discoveries that preceded them and helped make them possible. The following pages contain but a few of many such examples of the continuity of excellence throughout more than half a century of Medical Center accomplishments. As Isaac Newton once said in his now-classic paraphrase of a 12th century aphorism: "If I have seen further it is by standing on the shoulders of giants."



From the standard for newborn assessment to prevention of breathing disorders in infants

Although Dr. Virginia Apgar, a Columbia-Presbyterian anesthesiologist, made numerous contributions to her field, she perhaps will be best remembered for her contribution to obstetrics in the early 1950s—a simple, yet highly informative method of assessing the newborn.

Dr. Apgar's contribution, like the doctor herself, was unconventional. One morning, at the usual gathering of anesthesiologists for breakfast in the cafeteria, a medical student remarked that there seemed to be a need to evaluate the newborn more effectively. Dr. Apgar—who was developing a

numerical score for evaluating infants from the anesthesiologist's perspective—said: "That's easy! You'd do it this way." Picking up the nearest piece of paper, a sign saying, "Please bus your own trays," she wrote down the five points now known as the Apgar score, and promptly ran off to obstetrics to try it out.

The Apgar score, still in use today, is a numerical expression of an infant's condition at birth. Usually determined at one minute and again at five minutes after birth, the score is based on heart rate, respiratory effort, muscle tone, reflex irritability and color. ■

The care of critically ill newborns, particularly premature infants, has changed dramatically since Dr. Apgar's tenure at the Medical Center. Today's neonatal intensive care unit is a maze of high-tech monitors and machines. But good care still relies on the human touch—i.e., the meticulous use of that technology—according to a recent study of eight major perinatal referral centers in the U.S. and Canada.

The study examined the outcome of infants with chronic lung disease, which was thought to be an inevitable consequence of prematurity. Unexpectedly, it was found that CPMC had much fewer complications with this respiratory disorder. CPMC's success was linked to the appropriate use of high technology as well as to the gentle and unique approach of another dedicated anesthesiologist, Dr. Jen-Tien Wung. Dr. Wung oversees respiratory care for all "preemies" in the neonatal ICU (which is under the direction of Dr. James Driscoll), allowing for more uniform care than at other neonatal ICUs.

For infants in respiratory distress, doctors at other institutions typically insert a tube through the nose or mouth into the trachea so that oxygen can be administered with a mechanical ventilator. The baby is given paralyzing muscle relaxants that supposedly prevent it from struggling against the respirator.

At CPMC, with early signs of respiratory problems, physicians and nurses employ short plastic nasal prongs (designed by Dr.



Dr. Virginia Apgar



Wung with help from Drs. Driscoll and L. Stanley James, director of Perinatal Medicine), in lieu of tubes and ventilators, to deliver a steady flow of warm, moist oxygenated air with low positive pressures. No muscle relaxants are given.

Dr. James, once a colleague of Dr. Apgar's, emphasizes that further studies are needed to determine exactly why CPMC fared so much better. It might have been the uniform approach, the use of the special nasal prongs, or the meticulous care provided by the medical and nursing staff. Even the most sophisticated area of medicine, it seems, is still a mixture of art and science. ■



From pioneering ophthalmic lasers to routine laser surgery

A history of the laser, from its inception to the present day, would be incomplete without mention of Columbia-Presbyterian Medical Center. Indeed, the origins of the laser can be traced to Dr. Charles Townes, a Columbia University physicist, who won the 1964 Nobel Prize in Physics for his research.

Ophthalmologists at CPMC were quick to recognize that the laser's unique ability to quickly deliver a strong, focused beam of light energy was perfectly suited

to eye treatment. They already knew that intense light could coagulate tissue in the eye, and the laser finally gave them the power to put that knowledge to the test. In 1962, Drs. Charles Campbell and Charles Koester conducted the first clinical tests of the ruby laser for the prevention of detached retinas. Even though they were using an extremely weak laser by today's standards, they succeeded—and changed the course of ophthalmology in the process. ■

*Preparing for
laser eye surgery*



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oday's ophthalmologist can choose from a wide array of lasers, many of which were introduced to medicine by CPMC physicians. One of the newest is the excimer laser, whose heatless beam cuts tissue with unparalleled precision without burning or tearing surrounding tissue. The first application of the excimer laser in tissue sam-

ples was described here by Dr. Stephen Trokel in conjunction with IBM scientists, who postulated that the phenomenon they discovered might be useful for microscopic etching of integrated circuits. Dr. Trokel expects the excimer laser will play a role in such procedures as corneal

transplantation, corneal reshaping and removal of corneal scars

Over the years, physicians in virtually every medical specialty have found a use for the laser. For example, surgeons make use of several types of lasers to control recurrent growths and bleeding in the gastrointestinal (GI) tract. The powerful neodymium YAG laser (Nd-YAG) is perfectly suited



to GI therapy because it can be used with flexible fiberoptic instrumentation. Dr. Kenneth A. Forde uses the Nd-YAG as a supplement to electro-cautery and traditional surgical techniques for controlling benign and malignant tumors of the colon and rectum.

Dr. Forde's colleague, Dr. Michael R. Treat, takes advantage

of the unique properties of the blue argon laser to cauterize arteriovenous malformations (AVMs)—or clusters of blood vessels. AVMs sometimes appear on the lining of the colon and rupture, possibly causing anemia and even death. Light from this laser is absorbed preferentially by the red blood vessels, and not by surrounding tissue.

Another advantage of laser surgery is that it is less traumatic to the patient and requires less anesthesia. Many of Drs. Forde and Treat's patients are able to leave the hospital in a day or two or do not even need hospitalization. Not too long ago, they would have faced major surgery and a long convalescence. ■

From early victories over infectious disease



Dr. Hattie Alexander

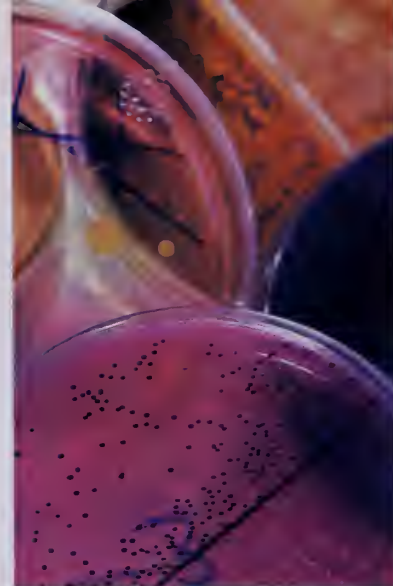
One day, in the 1950s, a young girl was brought to The Presbyterian Hospital for emergency surgery after a street accident. A bacterial culture was taken from an open leg wound for analysis. Many microorganisms were present, reported Ms. Balbina Johnson, director of the Surgical Bacteriological Laboratory, but not *Staphylococcus aureus*, even though it had been observed when the culture was first taken.

What had happened to the staph? Ms. Johnson poured over past records and found other puzzling disappearances. All had one similarity: the presence of bacilli (rod-shaped bacteria). She adroitly recognized that a bacillus or some other staph-destroying organism might have been operating in the cultures.

Indeed, the controversial sample was found to contain a harmless bacillus, *B. subtilis*, which apparently had entered the patient's wound. The bacillus turned out to produce a powerful staph-killing substance. The antibiotic was named bacitracin—*baci*, for bacillus, and *tracin*, for Tracy, the girl whose wound helped make history.

The microbial world was dealt further and more significant setbacks by Dr. Hattie Alexander, a CPMC pediatrician who developed a rabbit anti-serum for the first effective treatment of meningitis caused by hemophilus influenza, a highly fatal disease of childhood.

She also conducted extensive research into the genetics of the polio virus and the mechanisms by which bacteria change their susceptibility to antibiotics. ■



Most new antibiotics these days come from the combined efforts of large pharmaceutical companies and medical centers. CPMC's infectious disease specialists are routinely called upon to help develop and analyze new antimicrobial agents and conduct



to antibiotics that fight drug-resistant bacteria

clinical trials of promising drugs.

Of particular interest to Dr. Harold C. Neu and other infectious disease specialists here are antibiotics that are effective against drug-resistant bacteria. Such bacteria are a problem at any major medical center, where, because of the varied caseload, bacteria are exposed to many different antibiotics and, consequently, become drug resistant. He and his colleagues have been analyzing promising new classes of antibiotics—quinolones, peptolides and monobactams with novel molecular structures. In fact, the Department of Medicine has been involved in

the development and clinical evaluation of every antibiotic approved for use in the United States since 1957.

Even if these new antibiotics prove effective, Dr. Neu's work is far from over. "There probably will be a constant need to find new antimicrobial agents because bacteria are highly adaptable and quickly able to change their outer walls and other physical characteristics," which will render antibiotics ineffective, he explains.

Many infectious disease researchers at CPMC also have turned their attention to viral disease, and in particular to AIDS

(acquired immunodeficiency syndrome). For example, Dr. Richard Axel and his colleagues have been studying so-called T4 lymphocytes, white blood cells that orchestrate many actions of the body's immune system. T4 cells are "marked" by a certain protein on their outer surface. Dr. Axel's group has shown that any human cell marked by the T4 protein could be infected by the AIDS virus. They also found that the gene for T4 is expressed, or active, in human brain cells as well as in lymphocytes of the immune system. This may explain why AIDS is able to attack the brains of its victims. ■



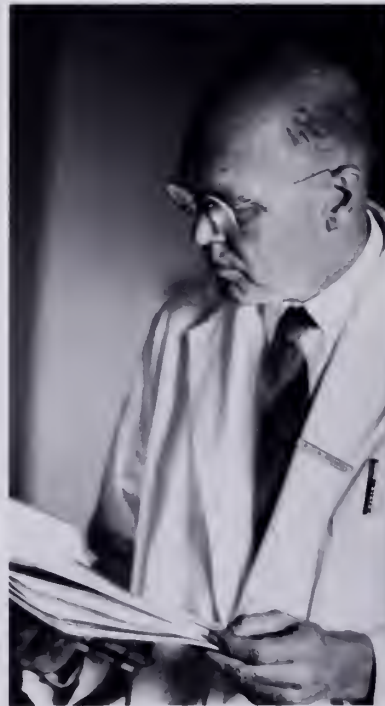
From heart-lung research to heart transplantation

"The actual quantity of blood expelled at each stroke of the heart and the circumstances under which it is either greater or less than ordinary, I leave for determination afterward . . ."

When William Harvey wrote those words in 1628, he probably thought it would take less than three centuries to glean the answers. But until the 1940s, when a patient complained of heart or lung trouble, a physician could not really tell what was happening deep inside those organs. He could listen to the sounds of the heart through a stethoscope, watch the flickering shadows of the heart and lungs on a fluoroscope screen, or look for fateful irregularities in the heartbeat in the peaks and troughs of an electrocardiogram. Still, it often was not enough.

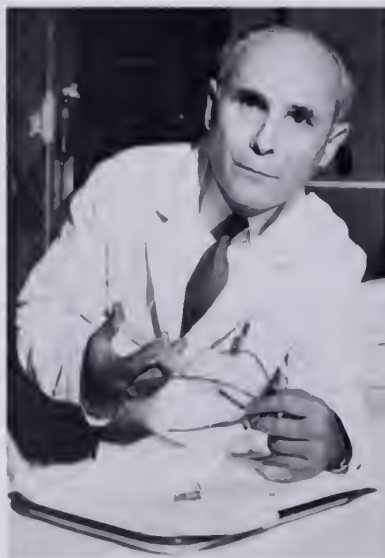
Picking up where Harvey left off, two young physicians on the faculty of the Columbia University College of Physicians & Surgeons began to study cardiopulmonary physiology early in the years of the Great

Depression. In the 1940s, the researchers, Drs. Dickinson W. Richards and Andre F. Cournand, using the newly developed technique of cardiac catheterization, obtained the first measures of cardiopulmonary blood pressures, and oxygen and carbon dioxide tensions and concentrations.

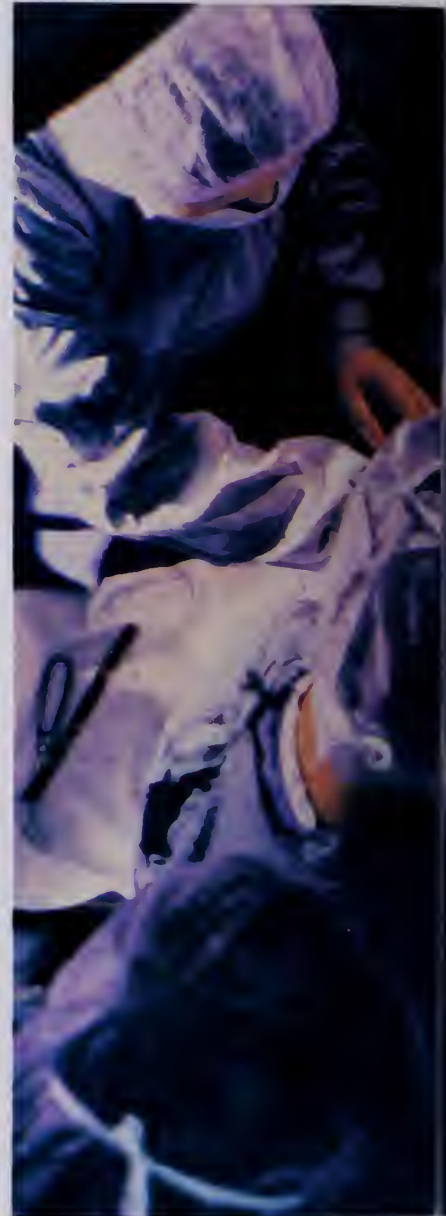


Dr. Dickinson W. Richards

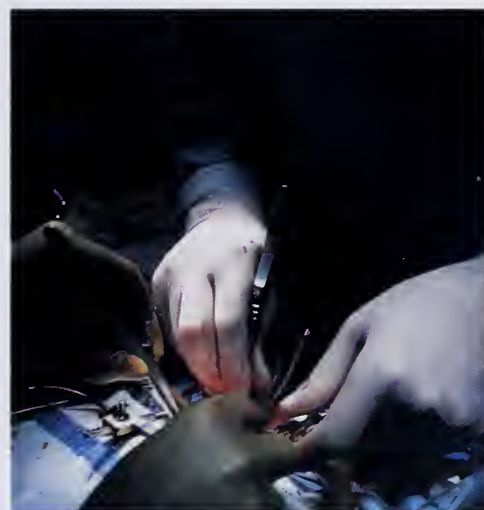
Quickly, the researchers unraveled the fundamental mechanisms of heart and lung action, which led to dramatic improvements in the diagnosis and treatment of cardiac and pulmonary disease. In 1956, Drs. Richards and Cournand (along with Dr. Werner Forssman) were awarded the Nobel Prize for their pioneering research. ■



Dr. Andre F. Cournand



After Drs. Richards and Cournand elucidated the fundamentals of heart-lung physiology, a new era of cardiac research began. Eventually, physicians learned how to transplant the human heart. Columbia-Presbyterian, led by Drs. Keith Reemtsma and Mark Hardy, started transplanting hearts in the late 1970s, when evidence was increasing that the initially disappointing survival rates could be improved. In the early 1980s, CPMC was one of a small group of medical centers to initi-



ate trials of cyclosporine, an immunosuppressive drug that has dramatically changed the entire field of transplantation.

Today, 80 percent of heart transplant patients have normal heart function after one year and 60 percent are still doing well after five years. CPMC physicians have made notable contributions to that record. Its transplant team was the first in the world to perform transplants on patients who were maintained on intra-

aortic balloon pumps, a mechanical device that maintains very sick patients. The first successful pediatric heart transplant also was done at the Medical Center.

Heart transplants have become "routine" at CPMC. Several dozen times a year, the transplant team is notified that a donor heart is available, sending into motion a large team of surgeons, anesthesiologists, nurses, pathologists, social workers, coordinators, counselors and technicians. From the first call to the final stitch, the process takes

ten to twelve hours. This does not include, of course, ongoing care of the recipient before and after the operation.

Even more obstacles face the group that performs heart-lung transplants. Only a handful of medical centers do this procedure, which "opens up a treatment avenue for a large number of people who have no other options," says Dr. Craig Smith, who leads this group. ■



Cystic fibrosis, an inherited disease that usually begins in infancy and is characterized by respiratory and digestive problems, was identified simultaneously and independently in more than one part of the world. However, credit is universally given to Dr. Dorothy H. Andersen, a CPMC pathologist and pediatrician, who described

the pathological anatomy of the disease in 1938 and differentiated it from other, less serious conditions.

Subsequently, CPMC researchers devised ways of detecting the disease in living patients, by measuring enzymes in material aspirated from the duodenum and by analyzing the amounts of salts in the sweat. ■





Cystic fibrosis affects the body's exocrine glands, particularly the sweat glands, which produce abnormally high concentrations of sodium and chloride ions. Using chloridometers and flame photometers, one can measure the quantity of these ions in the patient's sweat and make a definitive diagnosis. However, these are difficult tests—even the most minute contamination can render the readings inaccurate.

At CPMC's Special Chemistry Laboratory, extreme care is taken to keep the test free of contamination. Hours are spent cleansing and recleansing testing materials, following methods only employed here and at a few other hospitals. As a result, physicians from around the country and from overseas send their patients here for diagnosis or for confirmation of tests done elsewhere. ■

From the first bone bank to live bone transplants

Since even a minor flaw in the human skeleton can be devastating, it is not surprising that, in the 1700s, surgeons first attempted to repair skeletal defects with bone grafts, finally succeeding in the late 1800s.

Routine bone grafting became a reality in 1945, when Columbia-Presbyterian Medical Center opened the first bank for cadaver bone. The bone bank was made possible by the work of Drs. Leonard F. Bush and C. Zent Garber, who developed deep-freeze refrigeration techniques for preserving bone. The bone grafts were used to mend fractures that resisted healing and to fill gaps caused by disease, injury, or congenital deformity. Previously, amputation was the only recourse. ■

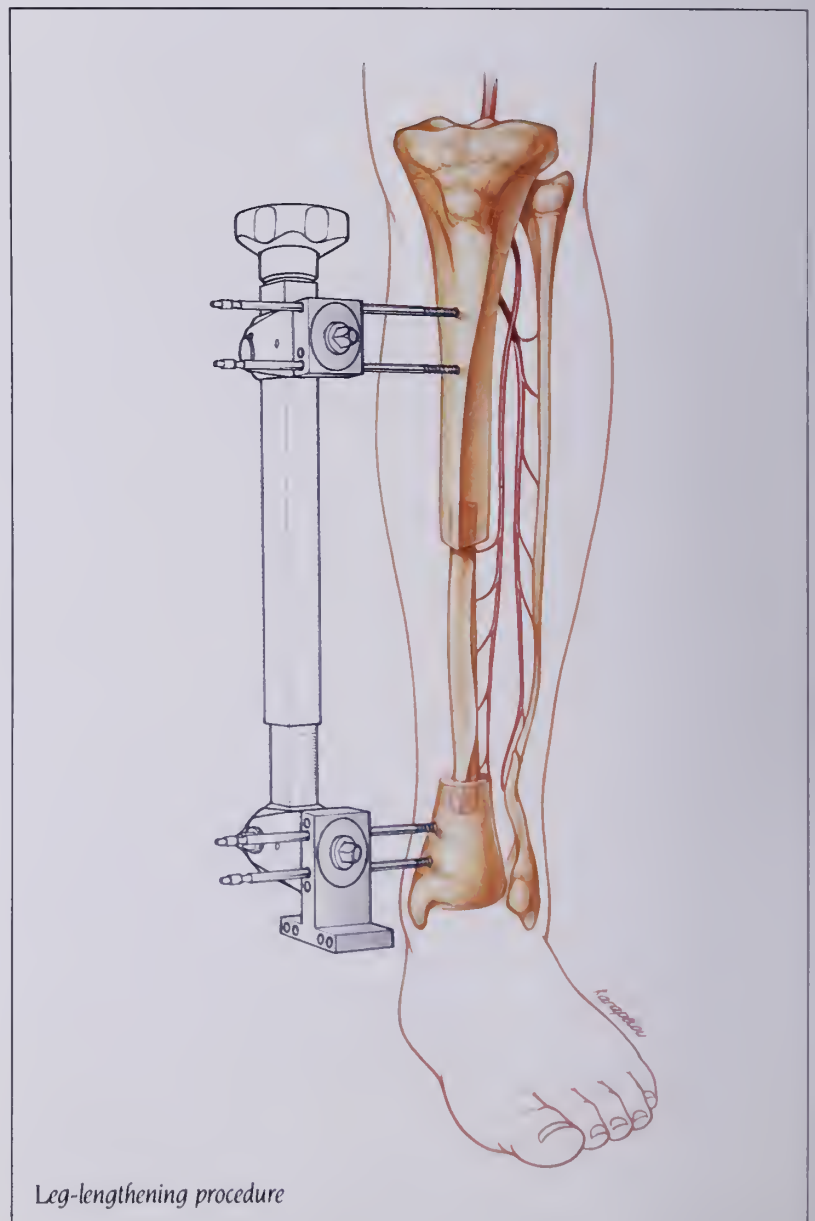
Cadaver bone grafts remain an essential part of the orthopedist's repertoire. Unfortunately, in some patients, bone grafts fail to take hold. Today, with the perfection of microsurgical techniques, these patients have another option—the transplantation of live bone.

For several years, orthopedists at CPMC have been transplanting non-essential portions of the patient's own bone—along with its associated veins and arteries—to the diseased or damaged area. According to Dr. Harold Dick, one of the first doctors in the U.S. to perform these procedures, bone can be taken from the pelvis, fibula or rib, and transplanted wherever needed.

Transplanted bone fragments also are used to lengthen limbs in

children with damaged or infected growth plates or with congenitally short limbs. In this rare operation, the affected bone is cut and gradually separated with the use of special devices. "Once we've achieved the desired length, we introduce bone fragments taken from another part of the body and fuse the parts," explains Dr. Dick. "Lengthened bones have normal strength after a few months." ■

Orthopedic surgeons here also have begun to transplant vascularized muscles from the thigh to the arm in an attempt to save limb function. Dr. Dick notes, "When tissue rejection problems are solved, we will be able to transplant major portions of limbs from donors. We now have the technology to secure bone in place and hook up nerves and vessels. We will have limb banks within the next generation." ■



Leg-lengthening procedure

From a treatment for Parkinson's to video rounds for movement disorders

Only a few years after the world's most comprehensive research center for Parkinson's disease was established at Columbia-Presbyterian Medical Center, the investment began to pay off. In 1969, Dr. Melvin D. Yahr, the center's director, announced the results of a clinical trial of a new drug on almost 400 patients at CPMC. The drug was L-Dopa, and it dramatically reduced the disease's characteristic symptoms—muscle rigidity, immobility and shaking spasms. ■



Dr. Melvin D. Yahr



Twice a week, a group of neurologists gather early in the morning to watch television. The purpose is not recreation, but diagnosis. More and more, physicians are referring patients—in the form of videotape—to the Neurological Institute, the nation's largest referral center for neurological disorders.

"Most of the videos are of patients from the Medical Center," explains Dr. Stanley Fahn, "but we get tapes from physicians at other hospitals all around the country. In those cases, we analyze the videos and write up our analyses in a letter to the referring physician. So the patient no longer physically has to be here to suggest a diagnosis and treatment strategy."

Dr. Fahn and his colleagues in England have launched a video medical journal, *Movement Disorders*, which consists of written

material and an illustrative videotape. "In movement disorder cases, a written description just isn't enough," he says. "The video journal will help physicians in diagnosing these disorders by actually letting them see the problem."

The journal is particularly important for disorders such as dystonia, a relatively rare disease. "Many physicians have never seen it, and they may not even recognize it," he says. Frequently, the symptoms of dystonia have been mistaken for other movement disorders or hysteria. In a few tragic instances, patients have been committed to mental hospitals. The tragedy is magnified because more than half the cases can be successfully treated if correctly diagnosed. ■

From a vaccine to prevent one blood disease to computerized bloodflow imaging to diagnose another

It was not long ago that babies with Rh-positive blood born to mothers with Rh-negative blood faced a substantial risk of heart failure, jaundice or brain damage. The complications often were fatal. The problem, called Rh hemolytic disease, actually arises after the mother's first Rh-positive child is born. The first birth stimulates the mother to produce antibodies that will attack any subsequent Rh-positive fetuses.

In the 1960s, two Columbia-Presbyterian physicians, Drs. John Gorman and Vincent Freda, developed a "vaccine" that stops the mother from producing the dangerous antibodies. The vaccine, called RhoGAM, must be

given to the mother soon after the birth of her first Rh-positive baby. RhoGAM works by destroying any Rh-positive cells that enter the mother's blood stream before they have a chance to trigger an immune response. Each year, hundreds of thousands of children benefit from Drs. Freda and Gorman's insights into immunology and hematology. ■

Using magnetic resonance imaging (MRI) and computerized tomography (CT) scanning, physicians who specialize in another blood disease—sickle cell anemia—are examining the dynamics of cerebral blood flow. This work holds great promise for the diagnosis and treatment of stroke, a common complication among sickle cell patients.

Information about cerebral blood flow is gathered through a special form of CT scanning in which the patient inhales a harmless, inert gas called xenon. Xenon, which is absorbed into the blood and then into the brain, acts as a contrast agent, much like iodine on a standard x-ray. The scanner's sophisticated computer software detects changes in brain tissue density, which are converted into precise measures of blood flow. CPMC was one of the first three medical centers in the country to have this technology.

If, for example, the patient has suffered a stroke, the physician can use the data to assess the neurological damage accurately. Or, if the patient has arterioscle-

rosis, the physician can determine if he is susceptible to stroke and if preventive measures are needed.

Dr. Jacqueline Bello, a Columbia-Presbyterian radiologist, and her colleagues are using "stable xenon-enhanced CT scanning" to find out why some sickle cell patients show no symptoms of stroke even though their MRI scans reveal lesions identical to



Drs. John Gorman (left) and Vincent Freda



those of sickle cell patients with stroke symptoms. If CT scanning shows that blood flow is impaired in the lesion areas of asymptomatic sickle cell patients, physicians would have a new "marker" for stroke. This would greatly influence the decision to institute preventive treatment,

such as transfusion therapy, which is not without risk.

These physicians also are studying cerebral blood flow in patients with arteriovenous malformations and Alzheimer's disease, as well as in patients before and after heart transplantation to see how the brain reacts to the replacement of a diseased heart with a healthy one. ■



From the vision of an academic medical center to the vision of its role in the community.

Beginning with its earliest years, The Presbyterian Hospital's most fundamental principle has been service to all in need. On the walls of the first Hospital building, which opened on New York's East Side in 1872, were the words of founding father James Lenox: "For the Poor of New York without Regard to Race, Creed, or Color." He and others provided the funds to realize that goal.

Some five decades later, Edward S. Harkness shaped the creation of the nation's first academic medical center, negotiating an alliance agreement between The Presbyterian Hospital and Columbia University's College of Physicians and Surgeons. His goals were threefold: to improve the quality of medical training, to fund research that would lead to medical advances and, through endowments, to enable the Hospital to continue its mission of service. ■



Today, a multimillion dollar endowment supports this tradition of serving all in need of medical care. The Ambulatory Care Network Corporation (ACNC) is one innovative example of this dedication to service. The Hospital plans to locate five ACNC practices throughout the neighboring Washington Heights/Inwood sections of Manhattan, which had been designated by the federal government as medically underserved. The first ACNC site now is operating in a

Washington Heights senior housing center.

Each new ACNC office will provide comprehensive, family-oriented primary care. ACNC physicians have both clinical appointments at the Hospital and P&S faculty appointments. ACNC brings the full technical and academic abilities of the Medical Center, combined with the organized concerns of its surrounding communities, to a system of sensible, coordinated and reliable primary care. ■

Research, Teaching and Patient Activities

Research workers, clinicians and teachers at CPMC developed new and innovative approaches to all aspects of health care, from the molecular level to the international scene, from the fetus to the geriatric patient. The following overview, by no means complete, gives a glimpse of the activity at CPMC during 1986.

Medical Center ophthalmologists, who have pioneered many medical uses of the laser, remain in the forefront of eye care. The neodymium-YAG (yttrium-aluminum-garnet) laser, first used clinically by CPMC physicians, is now being used instead of invasive surgery to treat complicated vitreo-retinal diseases.

On the experimental side, researchers are working with the excimer laser, which can produce precisely controlled, extremely refined changes in the cornea in order to alter the refraction of the eye. Refractive keratoplasty, as this technique is known, may eliminate the need for eyeglasses or contact lenses and give the patient clear, sharp vision. Ophthalmology researchers also are testing the krypton laser for managing diabetic retinopathy.

Other investigators have discovered an enzyme, critical to the operation of photoreceptors, that may be defective in some hereditary forms of photoreceptor degeneration, a major cause of blindness. This discovery may provide a precise link in the mechanism of this type of blindness and ultimately lead to a truly effective therapy.

In another area, researchers have successfully cultured retinal

cells and developed a closed-eye method of transplantation of retinal epithelium. In this method, the retinal cells are transplanted beneath the neural retina, which reattaches to the transplanted cells. These are important steps along the difficult road to human retina transplantation.

Using a different modern technology, magnetic resonance imaging (MRI), researchers are preparing to study lens proteins in cataract development. MRI will permit more precise definition of the molecular changes that cause lens opacities. In the Ocular Physiology Laboratory, studies continued on various aspects of ocular inflammation and the mechanism of presbyopia. The Laboratory, in collaboration with Pharmacia AB of Sweden, made great progress in the utilization of prostaglandin and prostaglandin-derivatives in the treatment of glaucoma.

Implantable Hearing Aids

Studies of receptor cells and nerve fibers of the inner ear have unraveled the fundamental code these fibers use to transmit information about complex sounds, such as human speech, to the auditory centers of the brain. These findings have important implications for the design of implantable auditory prostheses. For patients who cannot use ordinary hearing aids because of chronic infection or maldevelopment of the ear canal, otolaryngologists can now implant a titanium screw in bone behind the ear to hold a special hearing prosthesis.

CPMC clinicians continue their leadership in the surgical treatment of patients with severe forms of dizziness. In this treatment, surgeons selectively section the nerve supply to the balance function of the inner ear without affecting hearing.

In conjunction with neurologists, otolaryngologists have developed a comprehensive method for evaluating patients with movement disorders of the larynx.

Several advances were made by other neurologists investigating movement disorders. One group identified nebulin as the protein affected in Duchenne muscular dystrophy. Other scientists found that a popular drug for the treatment of peptic ulcer may also act on the brain to cause a form of parkinsonism.

In basic neurological research, investigators cloned the genes for several subunits of human cytochrome oxidase, an important enzyme of the mitochondria that is affected in several diseases. The cloned genes are being used to study the enzyme's regulatory function in developing muscle and how the enzyme changes in different diseases. An inherited lack of this enzyme may cause one form of Leigh disease—an increasingly recognized and often-fatal brain disease in childhood.

A neurology researcher has identified a new group of polypeptides in the nuclei of tumor cells; these peptides may play an important role in the control of cells by an antitumor drug, mevinolin.

Transcranial Doppler is being

used to study patients with stroke and other vascular brain diseases, sparing them the discomfort and hazards of unnecessary angiography—a procedure that requires injection of contrast agents. Other stroke researchers found that about one-third of strokes are unexplained despite all technological advances in diagnosis. On the more positive side, neurologists identified a new and treatable form of a clotting disorder (Protein S deficiency) that may be responsible for some stroke cases.

Other researchers in neurology, as well as in pediatrics, have begun to study the neurological complications of sickle cell disease. These studies are based on recent technical advances (cerebral blood flow analysis, MRI, and duplex Doppler studies of extracranial and intracranial blood vessels) in defining the pathophysiology of strokes.

Other Progress in Sickle Cell Research

Hematologists also are examining sickle cell anemia, specifically the relationship between biochemical defects and clinical disease. Experts in internal medicine instituted the first program in New York for the study of percutaneous balloon valvuloplasty, a less-invasive treatment for adults with valvular heart disease. Clinical research continued on the use of tissue plasminogen activator (TPA) in combination with coronary angioplasty as a therapy for acute myocardial infarction.

Endocrinologists continued to study pituitary hormones and the extent to which they are regulated by naturally occurring

opiates. Gastroenterology experts began a multicenter trial of alpha-Interferon for the treatment of chronic "B" hepatitis.

In light of the national shift of internal medicine training from inpatient to outpatient settings, internists began a critical re-evaluation of their efforts in ambulatory teaching of both medical students and residents. They also helped plan new ambulatory practice programs at CPMC.

Specialists in hormonal and metabolic diseases showed that intravenous administration of disodium etidronate significantly reduces serum calcium in patients with hypercalcemia due to a malignancy. Other experts developed new and highly sensitive assays for a pregnancy hormone, making it possible to detect clinically inapparent episodes of pregnancy loss, which occur in about one in five conceptions.

Hematologists identified and assayed the regions of fibrin molecules that develop crosslinks in blood clots. This information may lead to new methods for clot detection.

Infectious disease researchers in Medicine are analyzing the *in vitro* activity of new classes of antimicrobial agents against drug-resistant bacteria. This work may elucidate the mechanisms by which bacteria acquire resistance. Infectious disease specialists also are actively investigating AIDS, and a new molecular virology unit was established to study the disease. Plans have been made for inpatient and outpatient treatment of AIDS with new antiviral agents and for treatment of

the various bacterial and fungal infections associated with AIDS.

Oncologists identified a substance that protects normal cells, but not leukemic cells, from the inhibitory effects of a common drug for acute leukemia. Clinical testing of the substance has begun.

Rheumatologists discovered a new class of T-cell receptors. These are found on the surface of cells that can kill tumor cells and virus-infected cells. The receptors may be involved in combating cancer and viral infection.

Specialists in metabolism made discoveries that should add greatly to the understanding of the normal and abnormal functions of vitamin A. Renewal of a five-year, multimillion dollar grant from the National Institutes of Health will help support the Specialized Center of Research (SCOR) in Arteriosclerosis, one of only seven such centers in the country. The center involves both basic and clinical research in several divisions of the Department of Medicine as well as in other departments.

New Divisions in Pediatrics

One of the Departments involved in this SCOR is Pediatrics, where researchers in the Division of Pediatric Gastroenterology and Nutrition are studying the effects of lipoprotein structure and composition on lipid exchange and the ability of low-density lipoproteins to interact with cells.

Other new divisions were established: Pediatric Neurosurgery and Biomathematics. The latter will provide clinical biostatistical/biomathematical assistance to investigators throughout CPMC. Researchers in this divi-

sion also are working in conjunction with the SCOR.

Pediatricians also showed that experimental live attenuated varicella vaccine is quite effective in immunocompromised children and healthy adults.

Pediatric hematology/oncology experts, studying young children exposed to low levels of lead, found that iron deficiency greatly sensitizes them to the adverse effects of lead, even at extremely low levels of exposure. Thus, iron supplementation may help offset the effects of lead toxicity, a concept that has been accepted by the Centers for Disease Control and the U.S. Public Health Service.

Neonatologists achieved notable success in the treatment of very small and premature infants suffering from respiratory failure. A recent NIH survey of eight major university medical centers determined that the Babies Hospital Division of The Presbyterian Hospital achieved significantly better outcomes than the other seven North American centers.

Because of advances in pediatrics as well as in obstetrics and gynecology, perinatal mortality at CPMC declined again in 1986, to 11.4 per 1,000 births of all weights and to 8 per 1,000 for babies over 1,000 grams. The Medical Center's survival rate for very low birth-weight infants is perhaps the best in the country. The perinatal outreach program made this expertise available throughout the metropolitan area.

Perinatologists also continued their studies of fetal activity and responses to hypoxia during development. The goal of these





obstetrician/gynecologists is to devise better methods for assessing the long-term outcome of infants with birthweights under 1,500 grams. Research also progressed in continuous tissue pH monitoring during labor for assessing fetal well-being.

The *in vitro* fertilization program, continuing its expansion, initiated a technique of nonsurgical ovum retrieval employing vaginal ultrasonic guidance, a major advance in that it does not require anesthesia or hospitalization. CPMC is among the first in the country to use this technique for gamete intrafallopian tube transfer (GIFT) for patients with infertility of nontubal etiology.

In the gynecology-oncology program, researchers are investigating the relationship between human papilloma virus and squamous neoplasia of the female and male genital tract.

Ultrasonic studies have been initiated using vaginal ultrasound for the more specific delineation of ovarian pathology.

Obstetricians are examining the effect of gonadal steroid hormones on development of the cerebral nervous system and the relationships between these hormones and endogenous growth factors.

A referral service for genetic diagnosis and counseling has expanded. In addition to amniocentesis for genetic diagnosis, physicians are using chorionic villus biopsy to establish genetic diagnosis early in pregnancy.

Geriatric Research Expands

In conjunction with Brown University and the Pasteur Institute in Lille, France, CPMC began examining existing data on the

prediction of functional disability in the elderly. This project will prepare the ground for health promotion and disease prevention strategies oriented to the needs of the elderly. In another project, CPMC and the School of Architecture and Planning demonstrated a method for projecting the housing needs of the growing population of the very old and frail.

Advances in Training and Education

Training and education in geriatrics and gerontology received a boost from the creation of a Geriatric Psychiatry Fellowship and the awarding of a grant to create and demonstrate a model curriculum for a Master's of Public Health degree with a long-term care concentration. An innovative aspect of the curriculum is the emphasis on community-based approaches to long-term care. In addition, CPMC won a grant to provide training for medical personnel who work with the elderly in neighborhood health centers.

Training and education in dentistry were greatly furthered with the awarding of a grant to use strategic planning principles to assess the future direction of the School of Dental & Oral Surgery's programs. This is part of a national effort intended to spur the development of innovative dental curricula that will be responsive to the dental care needs of Americans for the next several decades.

The Oral and Maxillofacial Surgery Residency Program was integrated with the M.D. program of the College of Physicians & Surgeons. This change recognizes that oral and maxillofacial sur-

gery increasingly involves major surgery and consequently needs more practitioners with broad surgical training. The General Practice Residency Program now offers a unique two-year program for comprehensive management of the dental oncology patient.

A number of computer work stations were donated to the Medical Center as part of Project Aurora, a Columbia-IBM Advanced Education project. The computers will be used to develop a patient monitoring system and will form the core of a quality assurance teaching program.

The School of Nursing instituted several changes eventually to transform its entire faculty into either clinical or research scholars. The two faculty tracks will ensure that faculty remain current with clinical and research practice and contribute to the development of the profession. In conjunction with a unique new clinical preceptor program, which for the first time gives beginning nursing students hospital experience with one-on-one supervision, the new faculty program promises to provide students with a more realistic and comprehensive education. The School also created an Articulated Masters Plan, which will streamline the studies of registered nurses wishing to pursue advanced clinical specialty degrees.

Teaching activities also were expanded in orthopedics with the addition of new courses in surgical anatomy and surgical pathology. A new Orthopedic Research Laboratory was established with state-of-the-art equipment and leading investiga-

tors in the field of cartilage bio-engineering.

Orthopedics also saw several clinical improvements in the past year. Orthopedic surgeons added shoulder and wrist arthroscopy to their treatment repertoire and continued to improve their innovative use of continuous passive motion techniques for postoperative treatment of knee and ankle surgery. The practice of sports medicine was added to the department and a full sports medicine service also was opened at Columbia-Presbyterian Medical Associates/Eastside.

At the Health Sciences Library, both training and communication were advanced with several developments, including the opening of a microcomputer laboratory in the Media Center. The laboratory, which is available to all faculty, staff and students, features a variety of computer hardware and software. In addition, the CLIO (Columbia Libraries Information Online) system started operation. It now is the primary mode of locating information on holdings of all Columbia libraries. For the first time, it makes information on books at the Morningside Campus directly accessible at CPMC.

The library staff reported a growing use of computers and computer-based instruction in education programs around the Medical Center and expanded its own roster of teaching programs for on-line database searching and making more effective use of database information.

Important improvements in data utilization also were made





in Pathology, where the Division of Pathology Data Management is directing efforts to computerize the anatomic pathology divisions. This work will coordinate with the Laboratory Information System in the new Division of Laboratory Medicine, which will oversee training in clinical pathology.

Research in Pathology has focused on four major areas: neurobiology, cell biology, immunology and carcinogenesis. One research group is examining the expression of specific genes in individual neurons or small clusters of neurons of known physiological-behavioral function. Investigators have identified a set of genes whose expression is restricted to glial cells, allowing one to trace the origin and control of expression of these genes during the development of the peripheral nervous system in vertebrates.

Cell biologists are focusing on the organization, composition and biosynthesis of the actin-based cytoskeleton and its determination of cell shape, motility, and surface topography. In immunology and immunogenetics, researchers are studying the development of cells involved in the rejection of kidney and heart transplants.

Pathologists who specialize in oncology are identifying and characterizing cellular oncogenes activated in cells that are transformed *in vitro* by radiation. Others are identifying critical hormonal and nutritional factors that modulate cell transformation by radiation, chemicals and an RNA tumor virus. Using combined histologic and molecular

analyses for papilloma viral DNA, researchers identified a close relationship between certain strains of papilloma DNA and specific histologic changes associated with pre-cancerous genital lesions.

Service-learning Projects and Fellowships

Programs in Occupational Therapy improved with the creation of a service-learning project in physical disabilities in Vanderbilt Clinic. Fourteen students provided supervised treatment twice weekly to outpatients.

A student fellowship program for pre-medical and medical students was revised by Rehabilitation Medicine to allow more participants and additional teaching affiliations.

Researchers in rehabilitation medicine applied somatosensory evoked potentials for localizing lumbar nerve root compression syndromes as well as for patient monitoring during decompressive surgery. The Rehabilitation Medicine Laboratory now is investigating several disorders: autonomic dysfunction in abnormal and normal states, causalgia and lower motor neuron lesions; the mechanisms of vertebrate thermoregulation circulation in biological heat transfer; polyamines and wound healing in mammals; the mechanism and epidemiology of postmenopausal hot flashes; aging and brain neurochemistry; the neurochemical aspects of Parkinson's disease; and the pharmacology and effects of temperature on the microvasculature.

Improved Patient Monitoring

The number of complex surgical cases continued to increase and with it the need for more extensive patient monitoring. Recent developments now allow for on-line measurements of oxygen saturation and exhalation of carbon dioxide, which permit safer peri-operative care.

Anesthesiologists found that use of narcotics in spinal areas provide significant postoperative relief with minimal complications. Further studies are in progress to determine how extensively this therapy should be used.

Anesthesiology researchers are studying a host of other areas, including the interactions of the endogenous opiate receptor system with anesthetic agents. Others are examining the role of various extracellular mediators of myocardial contraction and their interaction with anesthetic agents, which may provide a clue as to why potent inhalation agents decrease cardiac function.

Another team is studying the effects of drug addiction and various addictive compounds on the fetus and mother, which may improve the care of both the addicted mother and the fetus before and after birth. The modification of the hemoglobin molecule and its ability to deliver oxygen also is under investigation. Still other researchers are looking into the metabolism, oxygen consumption and energy requirements of critically ill patients, which should help improve nutritional management and speed recovery.

Numerous research projects in nutrition are underway, including: nonsurgical reduction of stomach

capacity in obesity; the effect of plasma volume expansion during maternal undernutrition; coffee consumption during pregnancy; chronic exposure to cigarette smoke during pregnancy and fetal growth; and the effect of prenatal alcohol consumption on placental and fetal growth.

Many aspects of reproduction are studied here. Studies were completed on the regulation of hypothalamic pituitary peptide hormones and gene expression in the placenta. Research continued in the regulation of the GnRH neural oscillator and the control of the primate menstrual cycle of opioid peptides; the meiotic characteristics of gonadal tissue from infertile men and women; the structure of DNA in germ cells; and the effect of estrogen on neural development.

Several studies of DNA were completed at CPMC. One researcher demonstrated a key link between protein regulation mechanisms in yeast and man, which will greatly assist the use of yeast model systems to understand human metabolic regulation and metabolic disorders.

In another project, it was shown that it is possible to prepare and purify intact DNA molecules as large as 10 million base pairs. This extends the size range of DNA studies by a factor of ten and increases the feasibility of working with intact DNA from human chromosomes, which are only five times longer.

One investigator successfully cloned the genes for a number of important substances, including a peptide that may be a natural analog of the benzodiazepine

drugs, since it binds to the same receptor. The others are parts of coated vesicles that play a large role in how cells communicate with their external environment.

Another researcher, demonstrating the feasibility of gene therapy, showed that when a gene for normal globin is injected into a mouse egg destined to develop beta-thalassemia, the gene provides a sufficient level of beta-globin and the disease does not emerge as expected.

Unraveling the Secrets of Genes

Researchers here cloned the gene for the AIDS virus receptor and defined the gene's complete amino acid sequence. Other investigators discovered how RNA tumor viruses are integrated into the DNA of host cells infected with such viruses.

Biochemists developed a new and improved method of combining neutron and X-ray scattering techniques for defining, at semi-high resolution, the structure of non-crystalline proteins. Researchers also made a major advance in our knowledge of the assembly of the outer coat of a very large mammalian respiratory virus—adenovirus—and fabricated a new class of antibodies (anti-idiotypic antibodies) that bind to specific steroid hormone receptors.

Researchers in neurobiology and behavior studied the pathways in the brain that control movement; the biophysical and network properties of neurons that underlie epilepsy; the membrane biophysics of taste buds; and the molecular processes that mediate development and synaptogenesis.

The application of video-enhanced microscopy led to a completely revised interpretation of the mechanisms by which axonal elongation occurs during growth and regeneration. Structural changes in synaptic architecture that contribute to long-term changes in behavioral plasticity were demonstrated and a neuropeptide that produces long-lasting synaptic effects was identified. Researchers analyzed in detail the mechanisms by which second messengers (such as cyclic adenosine monophosphate, dicylglycerol, and arachidonic acid) can act individually or in concert to modulate the process of synaptic transmission. A major focus of Medical Center studies are the mechanisms that underlie synaptic plasticity and behavioral modification.

Human Behavior

Numerous researchers are investigating human behavior in its many forms. Schizophrenia research efforts were enhanced by a four-year grant to support a young investigator. A new fellowship in the clinical neurosciences, which supports four fellows and one junior faculty member, was jointly awarded by the Charles A. Dana Foundation to the Departments of Neurology, Psychiatry and Neurological Surgery. Brain research was aided through funding for a SPECT machine, an additional rCBF machine, and a densitometer for autoradiography.

In Child Psychiatry, studies began in the epidemiologic, biologic, clinical and preventive par-

adigms of adolescent suicide, and the developmental psychoendocrinology and the epidemiology of drug use. The recruitment of a population geneticist and the development of a cell bank, which has the capacity to store pedigrees, greatly enhanced the genetic studies of psychiatric disorders. Psychiatry initiated a Communications Disorders Clinic, which treats children with language disorders and autism at Presbyterian's Babies Hospital Unit, and is creating a computerized clinical database for the outpatient clinics.

Major funding was received for studies on the use of imipramine to treat cocaine abuse. Psychiatrists also developed an innovative on-site day treatment program for homeless men in the Fort Washington Men's Shelter. A Director of Community Psychiatry was appointed to facilitate provision of mental health services to area residents, and therapeutic programs and cultural events have been developed for the Hispanic community.

Emergency services were upgraded through increased staffing and improved safety measures. A Behavioral Medicine program was established that will include programs on smoking cessation, weight control and stress reduction.

The Memory Disorders Clinic expanded its staffing and included treatment for patients with multiple etiologies, as well as Alzheimer's disease. CPMC was one of 12 centers nationwide to receive clinical training grants for treatment of chronic mental illness.

The Psychiatric Consultation/Liaison Service, in collaboration with Presbyterian Hospital's Medical Service, developed a unique program of group sessions for interns to help them cope with stress and to increase their skills with difficult patients. Another innovative change brings medical students in their third-year clerkship into ongoing research and clinical care on inpatient units.

Two important milestones in Psychiatry were the formal establishment of the Howard Hughes Institute program in neurobiology and behavior at Columbia University and the New York State Psychiatric Institute, and the establishment of the Irving Philips Chair in Child Psychiatry.

In the Center for Psychoanalytic Training & Research, studies were conducted in a number of areas, including: predictions and dreams in psychoanalysis; premenstrual syndrome; depression; conversion from psychotherapy to psychoanalysis; psychoanalysis and Type-A personality; homosexuality; sexual fantasies, and mother-infant relationships

National and International Needs

A Development Law and Policy Program assisted lawyers, legislators and other policy makers around the world in analyzing and improving laws and policies that affect population, family planning, maternal and child health and the status of women. This year the program worked in several countries in South and Central America, the Caribbean, and Africa

A Market Traders Community-Based Distribution Project in Nigeria arranged for 30,000 young women market traders to sell birth control devices and health commodities along with their usual wares in exchange for a percentage of the sales price.

A Public Health Nutrition Unit examined the effects of socio-economic, biologic, and cultural factors in infant feeding practices among urban women in four developing countries.

Researchers also analyzed trends in infant mortality and demonstrated the influence on infant birthweight of such maternal characteristics as race, ethnicity, age, education, marital status, parity and conditions during pregnancy.

An eight-year project began to provide a comprehensive school-based health, academic and social support system for economically disadvantaged young adolescents in middle school in Washington Heights/Inwood.

Health workers trained rural medical officers in the Sudan in primary health care delivery and outreach and conducted several in-country training courses.

CPMC sent ten students to the Eastern Caribbean to work for a month as interns in family planning and child health programs.

Public health workers began a prospective longitudinal study of the decision-making process of poor women and their partners concerning voluntary sterilization and the psychosocial effects of the decision.

Advances in Cancer Research

Urologists began collaborative inter-institutional programs in renal and bladder cancer and

CPMC became a charter member of the Urological Cooperative Oncology Group. In conjunction with pathologists, urologists now perform DNA determination of all body fluids by flow cytometric analysis.

Urologists made major inroads in the treatment and diagnosis of urinary incontinence. Physicians devised techniques for distinguishing prostatic obstruction from bladder contractility disorders and launched pioneering work in developing computerized analysis of urodynamic parameters to diagnose bladder disorders. Other current projects include the use of flow cytometric analysis of testicular aspirates in the diagnosis and treatment of male infertility and a multidisciplinary team approach to pediatric neurogenic voiding disorders.

Urology researchers also are studying molecular signaling in renal growth and regrowth, and the microvascular hemodynamics of the varicocele, which is the leading cause of male infertility. In addition, they are developing new techniques for the study of tumor aneuploidy by flow cytometric analysis.

Interdisciplinary cancer research at CPMC includes an examination of gene expression with an emphasis on factors involved in the regulation of transcription termination; analysis of the steps in carcinogenesis; interaction of carcinogens with DNA; study of human lysozyme variants; control of gene expression in yeast; gene regulation in neural tissue; and hormonal, developmental and tissue-specific control of gene expression.



1986 Administrative Report: Columbia Presbyterian Medical Center

In 1986, Columbia Health Sciences and The Presbyterian Hospital were deeply involved in the process of renewing a major national resource—Columbia-Presbyterian Medical Center—which they founded jointly in 1928.

Concurrently, they were conceptualizing and developing programs to assure that modernization of the Medical Center in turn would benefit the public to the greatest extent possible.

"Both Hospital and University administrations are committed to doing as much as possible to maximize—through resource sharing and education—the return on society's considerable investment in this Medical Center," said Thomas Q. Morris, M.D., President and Chief Executive Officer of The Presbyterian Hospital/CPMC.

Our Public and Private Benefactors

As a result of the generosity of philanthropists such as Charles and Herbert Allen, Jr. and foundations such as Sherman Fairchild, the Hospital has been able on the one hand to build a new pavilion for a community in great need of routine health care, and at the same time ready itself for a day when instantaneous retrieval and storage of information will be as important a tool for physicians as their stethoscopes are today. In recognition of their foresight and generosity in funding the Hospital's new Allen Pavilion and Information Communications Center, respectively, Charles and Herbert Allen and Walter Burke,

President of the Sherman Fairchild Foundation were honored in October at our first CPMC Founders Day and were awarded Harkness Medallions.

Public support and understanding is equally important to Columbia-Presbyterian Medical Center. In particular, this means the elected and appointed officials who help institutions such as ours meet the ongoing expenses of clinical, teaching and research activities, through State and Federal health care programs such as Medicaid and Medicare, and the National Institutes of Health (NIH).

"In fact, because we have such an extremely active basic and clinical research staff at the Medical Center, Columbia Health Sciences is one of the five largest recipients of NIH research grants and contracts in the nation," noted Henrik Bendixen, M.D., Dean of the Faculty of Medicine and Vice President for Health Sciences at Columbia University.

As of last June 30, Columbia Health Sciences had received \$121,616,200 in government research support and \$13,437,000 in nongovernment funding for 1986.

Extramural support to the Hospital also is noteworthy. In addition to the \$3.6 million in patient care-related grants awarded to the Hospital in 1986—over 200 percent greater than the value of grants provided to the Hospital a decade earlier—Presbyterian was the recipient of \$22.2 million in pooled state funds to help support care for the medically indigent, which will cost the hospital \$12 million

in 1987 alone. The latter funds were made available to Presbyterian specifically because it provides more unreimbursed care to the needy than any other academic medical center in New York.

As federal support decreases, it is essential that the State's commitment to the care of the indigent be maintained.

Maximizing the Return on Society's Investment in CPMC

One of the most pressing areas of need for the services we provide is among the disadvantaged, and the Medical Center is extremely active in providing special services to those in need.

The most visibly underserved people in our inner cities today are the homeless. As the rest of society withdraws its support, hospitals are left to meet the enormous social as well as medical needs of homeless men, women, children and families.

Presbyterian Hospital pediatric nurses, moved by the plight of infants awaiting foster placement—the so-called "boarder babies" now found in nearly every urban hospital—are so moved that they literally try to adopt their tiny homeless patients.

The Hospital, pressured on the one hand to "deinstitutionalize" patients—particularly the mentally ill—and faced with a growing awareness that community-based services are inadequate for the most part, took matters into its own hands and opened a psychiatric service in the city's large-

est men's shelter, which is located nearby

Even in relatively affluent, middle class communities, family doctors move, retire and pass away, and are not replaced. In a community which cannot easily support many new primary care practices, some other source of physicians is needed. In the Washington Heights/Inwood section of northern Manhattan, where CPMC is located, the needs are particularly great, since a large proportion of local residents are uninsured and/or undocumented

In response to this great need, the Hospital has been developing and supporting an Ambulatory Care Network Corporation (ACNC), which will open in 1987 at a number of locations, staffed by academic physicians and dentists who are attendings at the Hospital and also faculty members in various divisions of Columbia Health Sciences. These doctors' practices have been designed in sharp contrast to the relatively sterile environment found in older Hospital clinics, and will provide community-based primary care services for community residents in support of the inpatient programs at the Allen Pavilion and Columbia-Presbyterian Medical Center.

In parallel to the ACNC program, in 1986 the University's Center for Population and Family Health raised seed money for a local network of school clinics, two of which now are staffed and operated by the Hospital. Some of the children who rushed into the clinics for appointments when they first opened rarely had



had the opportunity to see a doctor. None of them was old enough to remember when every city school had a staff nurse.

At the other end of the age spectrum are the area's many seniors, and here, too, the Medical Center has endeavored to make a positive impact on the lives of its neighbors. Through all the area's excellent senior centers, the Hospital has been providing health promotion services funded in part by the New York Foundation. These range from traditional workshops, classes and screenings, to individual counseling for seniors who need a little extra reinforcement, guidance and encouragement if they are to follow their doctor's instructions about diabetes, hypertension, arthritis, weight control, etc. A CPR training program for senior center staff also is under development. It will be funded by the Hospital Auxiliary.

The University, too, provides extensive services at the senior centers—occupational therapy for the handicapped at an adult day care center, for example, as well as health services provided by faculty of the School of Nursing, with the participation of other Columbia faculty and students.

AIDS

The most threatening public health menace today is acquired immunodeficiency syndrome or AIDS. The Medical Center has taken steps to meet the challenge head on, in a number of ways. For its part, the Hospital has submitted plans to establish an AIDS Center, one of approximately 20 that initially would be designated by the New York State Department of Health. It will provide specially designed inpatient and outpatient services appropriate for patients with this terminal illness.



At the same time, the University and Hospital are working together, under the leadership of the Department of Psychiatry and the School of Public Health, to develop an AIDS Research Center, which would feature a strong educational component to combat the spread of AIDS.

The Hospital also is strengthening and expanding its tertiary care referral programs, to better serve a wider geographic area. The heart transplant program, for example, is one of the largest and most successful in the nation, and the only one certified in the

State of New York. CPMC transplant surgeons today are saving younger and younger patients, some only weeks old.

Infants also are benefitting from the Regional Perinatal Network, which links hospitals throughout the tri-state area to our service for complicated pregnancies and our neonatal ICU, determined to be best among eight major North American centers in the management of newborns in respiratory distress, according to a study which will be published in the journal *Pediatrics*.

In 1986, CPMC began to formalize its growing commitment to the larger medical and dental communities through the formation of a "Columbia-Presbyterian Consultation/Referral Service."

The new Service is designed to make it easier for physicians, surgeons and dentists—whether or not they are directly affiliated with the Medical Center—to have access to information, consultations, second opinions, referral opportunities, research studies and certain diagnostic tests, some of which are not available elsewhere.

In addition, the Hospital entered into a number of formal agreements linking it with a variety of regional and national healthcare networks.

For example, in 1986, PH became a shareholder in Voluntary Hospitals of America (VHA). Through this affiliation, this Hospital will be linked with the hospitals at many of the nation's other prestigious academic medical centers, including New York Hospital, Johns Hopkins, Massachusetts General, Yale-New Haven, Barnes and Baylor.

PH and a number of other hospitals from New York City, Long Island and the counties north of the City also formed VHA Metro New York, a regional network. VHA Metro New York includes New York Hospital, smaller voluntary hospital systems and some of the area's finest free-standing community hospitals. The intention is to work with both the regional and national network to take advantage of economies of scale in purchasing and shared services, for example, and to develop joint ventures of benefit to all hospital participants.

One of the first and most visible VHA programs will be VHA teleconferences on topics of vital interest to management, supervisors and staff of the Hospital. These will be available through a satellite receiving station operated by Columbia University for use by oncologists and oncology nurses who are associated with the Comprehensive Cancer Center.

As the Hospital is modernized, its staff will be able to view continuing education programs at sites throughout the Medical Center and at other remote sites, especially the Allen Pavilion.

Patients already are able to view educational programs at bedside over Presbyterian Hospital TV (PHTV). These are broadcast in English on channel 12 and simultaneously in Spanish on channel 3. There also is a movie channel, a video message service and the option of viewing closed captioned TV in the evening. Regularly scheduled pastoral care programs also will be

offered over bedside TV in the near future.

In addition to the VHA and VHA Metro New York networks, CPMC physicians are actively involved in hundreds of other regional activities, such as post-graduate and continuing education programs at hospitals affiliated with Columbia and Presbyterian New Hospital affiliations include one with Manhattan Eye & Ear and a number of joint residency programs with Harlem Hospital.

CPMC staff also are among the most active participants in managed care networks. Many doctors already participate in Maxicare, a national managed care program, and the regional HealthNet program managed by Empire Blue Cross/Blue Shield. Presbyterian also became a partner in Maxicare New York, another major regional health-care organization formed by some of the city's largest and most active hospitals.

Quality Assurance

When Abraham Flexner was asked by Andrew Carnegie to analyze the quality of medical education in America in 1910, he found that it varied widely. His recommendations led to a better system of accreditation of medical schools. It also led Edward S. Harkness to the conclusion that the highest quality clinical, educational and research programs could be achieved only through the union of a prestigious medical school and noted teaching hospital. Largely through his efforts, Columbia's College of Physicians & Surgeons and The Presbyterian Hospital in 1928 formed the Columbia-Presbyterian Medical Center, the nation's

first academic health center.

Since then, it has been taken for granted that the academic medical environment, where students and faculty challenge each other and strive for excellence, automatically produces the highest quality care . . . but no longer. Today, nothing short of a continuous, systematic process of case review at the highest levels of management is acceptable.

In 1986, Hospital President Thomas Q. Morris, M.D. was asked to chair the Quality of Care Task Force established by the Hospital Association of New York State. That same year, PH began to put into place one of the most far reaching quality assurance programs in the nation.

Every clinical and administrative department now has a quality assurance plan, and is responsible for a systematic review of its activities. Reports are reviewed by the departments so that any problems identified can be corrected rapidly—immediately, if necessary. Summary reports are reviewed at the highest level by a committee which includes Hospital management and trustees, and which is chaired by the President.

"When you step into an airplane, you want to be reassured that every possible system has been checked and double-checked to assure your safety and comfort," said Dr. Morris. "You deserve nothing less from a hospital."

Dr. Bendixen added, "Through a joint health services research program, we will work together with the Hospital to help define 'quality health care' in the most specific terms. Through educa-

tional and clinical networks, we plan to share our findings with other medical centers throughout the country to put that research to work for the benefit of all our patients."

Looking Slightly Ahead into the Future

All activities at Columbia-Presbyterian Medical Center seem to be moving "fast forward"

In 1986, renovation and new construction of The Presbyterian Hospital at Columbia-Presbyterian Medical Center was on schedule, and progress was impressive even to veteran construction watchers. Construction at the Allen Pavilion actually was ahead of schedule.

Despite earlier delays, the Hospital has redoubled its efforts to establish large doctors' office practices throughout the Washington Heights/Inwood community. These will be operated by the new Ambulatory Care Network Corporation. The first center, at Ft. Washington Houses, will specialize in geriatrics.

Next year, the prospect of moving hospital functions into the massive new space as it becomes available, while maintaining operations, will be one of the great challenges. In fact, a new Office of Activation has been established with the sole objective of assuring that that transition takes place as uneventfully as possible. The first major test of the activation program will occur in the summer, as staff begins to move into the Babies Hospital addition.

In 1986, Babies Hospital staff introduced a highly acclaimed program for hospitalized children, featuring clowns from the Big Apple Circus.



Major benefactors of Columbia-Presbyterian Medical Center were awarded the Edward S. Harkness Medallion at Founder's Day ceremonies. Pictured, from left: Michael I. Sovern, President of Columbia University, Herbert Allen, Charles Allen, Jr., Walter Burke, Dr. Henrik H. Bendixen, Vice President for Health Sciences and Dean of the Faculty of Medicine, and Dr. Thomas Q. Morris, President of The Presbyterian Hospital.

At Columbia Health Sciences, as planning continues for the Audubon Research Park, other renovation projects, such as those of the animal care facilities, are taking place.

Significant impetus toward research advances was provided by several new grants to the Columbia Health Sciences Division, making possible the establishment of programs in "frontline" areas of biomedical science.

Columbia P&S is one of six American medical schools in which Howard Hughes Medical Institute laboratories are being established for structural biology research that will merge the experimental approaches of physicians and biomedicine. The five-year program has a national budget of \$60 million; this included a commitment to build a station at the Brookhaven Synchrotron specifically for the analysis of biological macromolecules. This facility will enhance the

Medical Center's considerable technical ability in molecular biophysics and will serve as a resource for the Howard Hughes Medical Institute's effort in this area. Structural biologists (also called molecular biophysicists) use techniques and instruments commonly associated with physicists to solve problems in dealing with the smallest components of genes and cells. Wayne Hendrickson, Ph.D., Professor of Biochemistry and Molecular Biophysics was named Hughes Investigator

Columbia Health Sciences faculty also benefitted from a relatively new approach to granting awards to individual scientists. One was a seven-year Jacob Javits Neuroscience Investigator Award, to Michael Gershon, M.D., Professor and Chairman of Anatomy and Cell Biology totalling close to \$1 million; the other was a seven-year National Cancer Institute Outstanding Investigator Awards to Charles Cantor, Ph.D.,

Professor and Chairman of Genetics and Development totalling about \$3.5 million. These grants are unique in that they are awarded not on the basis of a grant application for a specific research project, but on the basis of the faculty member's record of accomplishments and potential for future productivity. Because they are not limited to a described project, and because they are so large and for such a long term, they provide ample support for research while freeing the investigators from the time-consuming effort of applying for grants and renewals.

"These and similar grants are testimony to the excellence of our faculty's research," said Dr. Bendixen. "They are among many indicators that P&S research will remain in the forefront of bioscience not only this coming year but in many years to come."

We would like to welcome James B. Hurlock to the Hospital's Board of Trustees. We would like to congratulate Allan Rosenfield, M.D., who was named Dean of the School of Public Health, and Mary O. Mundinger, Dr. P.H., new Dean of Nursing. New Chairmen include Lucille Shapiro, M.D., of Microbiology, Michael L. Shelanski, M.D., of Pathology and Edward D. Miller, Jr., M.D., of Anesthesiology. The latter two also are Directors of Service at the Hospital. We would like to thank Drs. Bernard F. Erlanger, John J. Fenoglio and Allen Hyman for their service as acting directors.

New Hospital appointments included Victor DeMarco, Vice President, Finance, and Harry "Bud" Munson, Vice President, Human Resources. ■

Report on the Campaign for Columbia-Presbyterian Medical Center

The Campaign for the Columbia-Presbyterian Medical Center will raise \$245 million to finance a sweeping revitalization program to ensure that the Medical Center's standards of excellence in patient care, biomedical research and education are maintained now and into the 21st Century.

To date, the Campaign has raised nearly \$162 million for construction, endowment and on-going needs of the Medical Center. The Columbia-Presbyterian Medical Center greatly appreciates the many generous gifts from individuals, corporations and foundations.

Much has been accomplished, much is yet to be done.

Progress Toward Our Goals

Construction

- Construction on the new 745-bed hospital building is on schedule. The building will feature state-of-the-art facilities and technologies, and will be capable of serving patients with the most complex medical problems. Coupled with extensive renovations of existing structures, the new building will help reorganize and streamline patient care delivery at the Medical Center site.
- The Allen Pavilion, the new 300-bed community hospital, is under construction at 220th and Broadway. It will provide cost-effective care to northern Manhattan residents who have lost most health services through the closing of neighborhood hospitals.
- Half-century old research laboratories and teaching facilities

are being expanded and renovated to meet the needs of today's medical scientists and to accommodate state-of-the-art technology

- A new student center is being created to provide health sciences students with facilities they need for recreation and relaxation.

Endowment

- Two new endowed professorships in the Department of Medicine, one in the Department of Psychiatry and one in the Department of Anesthesiology have been established. To meet our Campaign goals an additional 25 endowed professorships will be created throughout the Medical Center to ensure our ability to attract and retain the best physicians and scientists.
- Endowments have been created for two new junior faculty positions in the Department of Medicine, one in the Department of Urology and one in research in the clinical neurosciences. The Campaign goals include the endowment of 25 more junior faculty positions to reduce the financial hardships for talented young medical scientists who seek academic careers.
- Endowed funds for student assistance are being increased so that scholarships, loans and fellowships will be available to continue attracting the future leaders of the health professions.
- New research programs are being endowed to ensure that the Medical Center's productivity and reputation for excellence will endure.

Founder's Day

On October 23, 1986, Columbia-Presbyterian Medical Center celebrated its first Founder's Day, an event which called attention to the critical role private philanthropy has played in the creation and sustenance of the Medical Center.

CPMC donors, friends, faculty, staff and students gathered to learn of the current state of the Presbyterian Hospital and of Columbia University's Health Sciences Division, and to celebrate the philanthropic legacy of CPMC founder Edward S. Harkness by honoring the donors of two Campaign leadership gifts.

First Harkness Medallions Awarded

The prestigious Harkness Medallions were presented to Mr. Charles Allen, Jr. and Mr. Herbert Allen, and to the Directors of the Sherman Fairchild Foundation in recognition of major Campaign contributions.

Investment bankers Charles Allen, Jr. and Herbert Allen contributed \$15 million toward the construction of the community hospital now named the Allen Pavilion in memory of the Allens' parents, Charles F. and Frances Allen.

The Sherman Fairchild Foundation's \$6.1 million gift will provide the new Presbyterian Hospital with the facilities to house a pioneering telecommunications network that will enable doctors and nurses to quickly and efficiently retrieve patient records, research data and other life-saving information. ■

The Presbyterian Hospital Financial and Statistical Review*

Statements of Revenues and Expenses and Changes in Unrestricted Fund Balances for the Years Ended December 31, 1986 and 1985

	(in thousands)	
	1986	1985
Operating Revenues:		
Patient service revenues	\$380,196	\$351,140
Allowances and uncollectable accounts	(88,005)	(84,844)
Net patient service revenues	292,191	266,296
Other services	18,138	16,372
Transfers from specific purpose funds	4,699	4,826
Total operating revenues	315,028	287,494
Operating Expenses:		
Salaries and related fringe benefits	202,394	193,136
Supplies and other expenses	99,945	85,827
Depreciation	20,924	17,499
Total operating expenses	323,263	296,462
Loss from Operations	(8,235)	(8,968)
Non-operating Revenues:		
Investment income	5,651	6,041
Legacies and contributions	2,094	1,746
Realized net gain on sales of investments	1,027	832
Total non-operating revenues	8,772	8,619
Revenues Over (Under) Expenses	537	(349)
Fund Balance, January 1	151,040	148,851
Transfer from Restricted Funds for		
Additions to property, plant and equipment	1,280	2,538
Fund Balance, December 31	152,857	\$151,040

Inpatient Statistics	1986		1985	
	Adult Pediatric	Newborn Nursery	Adult Pediatric	Newborn Nursery
Average Bed Complement	1,279	59	1,291	59
Patient days	410,538	21,322	415,298	18,010
Admissions	44,248	4,409	44,319	4,359
Average length of stay	9.25	5.08	9.31	4.36

Outpatient Statistics	1986	1985
Number of Visits:		
Medicaid	254,685	228,133
Medicare	73,366	71,920
Blue Cross	15,962	8,691
Self pay	143,442	143,159
Personnel and dependents	25,410	19,727
Total	512,865	471,630
Doctors' Offices	281,124	277,972
Grand Total	793,989	749,602

*A copy of the last financial report filed with the Department of State may be obtained by writing to New York State, Department of State, Office of Charities Registration, Albany, NY 12231, or the Finance Department, The Presbyterian Hospital, Columbia-Presbyterian Medical Center, New York, NY 10032-3784

Columbia University Health Sciences Division 1984-85 Highlights

	(in thousands)
Academic Expenditures	
College of Physicians and Surgeons	\$194,816
School of Dental and Oral Surgery	7,851
School of Nursing	2,381
School of Public Health	5,802
	210,850
Operating Expenditures	
Library	1,016
Physical Plant Administration and Utilities	6,584
Building and Equipment Maintenance	1,448
Custodial Services	1,833
Security	1,405
	12,286
	<u>223,136</u>
Asset Accounts	
**Gifts and Receipts Balance	
*College of Physicians and Surgeons	29,891
School of Dental and Oral Surgery	1,197
	31,088
**Endowment Principal	
*College of Physicians and Surgeons	121,365
School of Dental and Oral Surgery	3,603
	124,968
Quasi Endowments	
*College of Physicians and Surgeons	63,047
School of Dental and Oral Surgery	71
	63,118
	<u>219,174</u>
Number of Students	
Medical School	632
Other Faculty of Medicine Programs	173
School of Public Health	500
School of Nursing	333
School of Dental and Oral Surgery	300
	1,938
Full-time Faculty	
*College of Physicians and Surgeons	998
School of Dental and Oral Surgery	42
	1,040

*Includes the School of Nursing and the School of Public Health

**Includes Funds in Columbia University and CPMC Fund, Inc.

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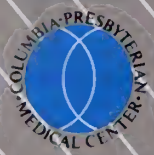
This report is in two parts.
Part II lists faculty publications,
professional staff and academic
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